



SKILLSHEET 11.4

Using tests to prove similar triangles

Triangles can be checked for similarity using one of the tests described in the table below.

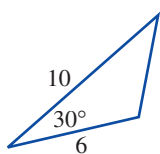
Test description	Abbreviation
All corresponding angles are equal in size.	AAA or equiangular (angle–angle–angle)
All corresponding sides are in the same ratio.	SSS (side–side–side)
Two pairs of corresponding sides are in the same ratio and the included angles are equal in size.	SAS (side–angle–side)
Both are right-angled triangles; the hypotenuses and one other pair of corresponding sides are in the same ratio.	RHS (right angle–hypotenuse–side)

Note: When using the equiangular test, only two corresponding angles have to be checked. Since the sum of the interior angles in any triangle is a constant number (180°), the third pair of corresponding angles will automatically be equal, provided that the first two pairs match exactly.

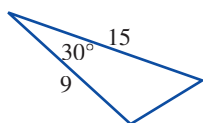
WORKED EXAMPLE 1

Find a pair of similar triangles among those shown. Give a reason for your answer.

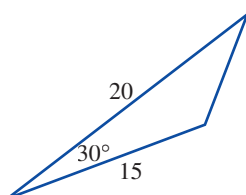
a



b



c



THINK

- In each triangle we know the size of two sides and the included angle, so the SAS test can be applied. Since all included angles are equal (30°), we need to find ratios of corresponding sides, taking two triangles at a time.
- Only triangles **a** and **b** have corresponding sides in the same ratio (and included angle of equal size). State your conclusion, specifying the similarity test that has been used.

WRITE

For triangles **a** and **b**:

$$\frac{15}{10} = \frac{9}{6} = 1.5$$

For triangles **a** and **c**:

$$\frac{20}{10} = 2, \frac{15}{6} = 2.5$$

For triangles **b** and **c**:

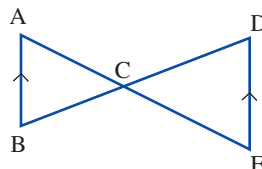
$$\frac{20}{15} = 1.\bar{3}, \frac{15}{9} = 1.\bar{6}$$

Triangle **a** || triangle **b** (SAS)



WORKED EXAMPLE 2

Prove that $\triangle ABC$ is similar to $\triangle EDC$.



THINK

- 1 AB is parallel to DE. Transversal BD forms two alternate angles: $\angle ABC$ and $\angle EDC$.
- 2 Transversal AE forms two alternate angles: $\angle BAC$ and $\angle DEC$.
- 3 While crossing each other, the two transversals form vertically opposite angles at C.
- 4 Triangles ABC and EDC have three pairs of corresponding angles of equal size and therefore are similar. State this using appropriate mathematical symbols and specify the similarity test being used.

WRITE

$$\angle ABC = \angle EDC \quad (\text{alternate angles})$$

$$\angle BAC = \angle DEC \quad (\text{alternate angles})$$

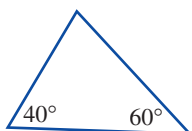
$$\angle BCA = \angle DCE \quad (\text{vertically opposite angles})$$

$$\therefore \triangle ABC \parallel \triangle EDC \quad (\text{equiangular})$$

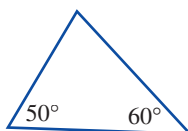
Try these

- 1 Find a pair of similar triangles among those shown in each part. Give a reason for your answer.

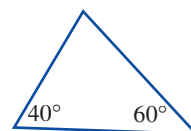
a i



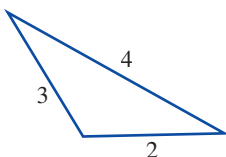
ii



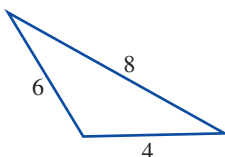
iii



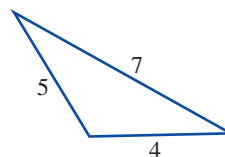
b i



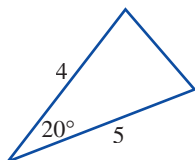
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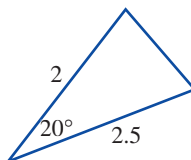
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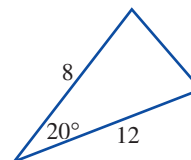
c i



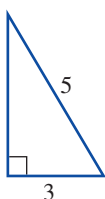
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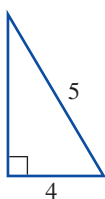
iii



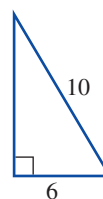
d i

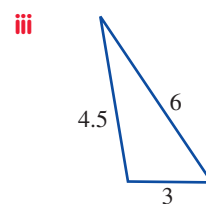
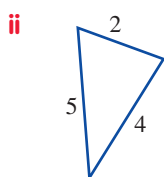
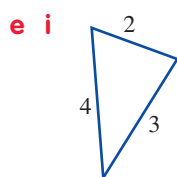


ii

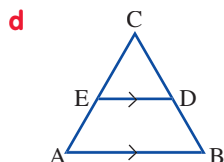
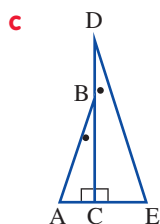
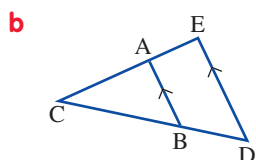
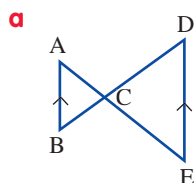


iii





2 Prove that $\triangle ABC$ is similar to $\triangle EDC$ in each of the following.



SKILLSHEET — ANSWERS

SKILLSHEET 11.4

Using tests to prove similar triangles

- 1 **a** **i** and **iii**, AAA
c **i** and **ii**, SAS
e **i** and **iii**, SSS
- b** **i** and **ii**, SSS
d **i** and **iii**, RHS
- 2 All figures can be proved for similarity using the AAA test.